

Picture Book Power: Connecting Children's Literature and Mathematics

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There once lived a wolf who loved to eat more than anything else in the world. As soon as he finished one meal, he began to think of the next. One day the wolf got a terrible craving for chicken stew. (Kasza, 1996, n.p.)

A Hundredth Day Celebration

On the hundredth day of school, I held up my copy of *The Wolf's Chicken Stew* by Keiko Kasza (1996), read the title, and gave the author's name. I told my group of primary students, gathered on the floor around me, to look at the picture on the cover and asked, "With a title like that, *The Wolf's Chicken Stew*, what do you think the story will be about?" Jason (all student names are pseudonyms) enthusiastically predicted, "That wolf is going to make stew out of that chicken!" Margo spoke up, "The wolf is going to invite the chicken to come have stew and then eat her." Tyrell countered, "The wolf and the chicken are going to become friends."

I wrote each prediction on the board and asked the students what made them think as they did. Invariably, they referred to the title and the cover picture. I returned to each prediction and asked the group, "How many think the wolf is going to make stew out of that chicken? Raise your hand." I counted the hands raised for each prediction and wrote the number beside the prediction. Then I said, "Well, let's find out if any of you are right," and began reading to an audience eager to find out if their predictions were correct.

The Wolf's Chicken Stew (Kasza, 1996) is a children's book that tells about the efforts a lovable wolf undertakes to fatten up a chicken to make her just right for his stew pot. He makes her a hundred pancakes, a hundred donuts, and then bakes a cake "weighing a hundred pounds" (n.p.), making this a wonderful story for a hundredth day celebration. The wolf took each offering on subsequent evenings to the chicken's house, calling out as he left each gift, "Eat well my pretty chicken, get nice and fat for my stew" (n.p.). Of course, in the end, the chicken and all her

little chicks thank the wolf for his gifts and serve him a nice supper.

At the end of the read-aloud, Tyrell commented, "See, I was right, they became friends!" Jeffrey, cueing off the last picture in the book, guessed that the wolf baked the "little critters" a hundred chocolate chip cookies the next day. Margo spoke up and said, "I wish I had a hundred chocolate chip cookies" and the rest of the group agreed.

Making the Literature/Math Connection

Once the story was over and the students decided that the third prediction, "The wolf and the chicken are going to become friends," was the right one, we decided to see which of the story's foods were our own favorites. We wrote the foods down on the board and voted, writing the number of votes beside each food. Then we constructed a graph of our favorite "Wolf's Chicken Stew" foods. Finally, we got out a cookbook, read a recipe, carefully measured the ingredients, and made and baked a hundred chocolate chip cookies, the undisputed favorite food on the class graph. Finally, the children wrote their own recipes for making a hundred pancakes. We spent the hundredth day of school celebrating the literature/math connection.

These primary students were excited to make predictions. They listened intently to the story to see if their predictions were right and began making literature/math connections between the story and their own lives. They also made, baked, and enjoyed chocolate chip cookies while learning the importance of accurate measuring.

According to Whiten and Wilde (1992, 1995), literature motivates students to learn, provides a meaningful context for math, celebrates math as a language, demonstrates that math develops out of human experience, fosters the development of number sense, and integrates math into other curriculum areas. My students were motivated to graph their

favorite hundredth day foods following the sharing of this story. Graphing, reading a recipe, measuring ingredients, using measurement terms, deciding who should receive some of our cookies, and then dividing the cookies up were learning experiences that provided opportunities for number sense development as well as challenges for decision making.

Why Make the Literature/Math Connection?

U.S. teachers are now required to meet state standards in mathematics and the English Language Arts. Many states use the standards created by national professional organizations to shape their own state standards (Columba, Kim, & Moe, 2005). Thus, the *Standards for the English Language Arts* (International Reading Association & National Council of Teachers of English, 1996) and the *Principles and Standards for School Mathematics* (National Council of Teachers of Mathematics [NCTM], 2000), in concert with state standards, enable teachers to set appropriate goals and objectives for learning and to determine what has been accomplished. These standards encourage teachers to make interdisciplinary connections. For example, the *Principles and Standards for School Mathematics* (NCTM, 2000) recommend that students do more reading, writing, and discussing ideas and that children learn mathematical ideas in real-world contexts.

Children's literature can be the vehicle for providing a meaningful context for learning in mathematics as it helps learners value mathematics, encourages learners to be mathematical problem solvers, provides

a meaningful context for children to communicate mathematically, supports learners in reasoning mathematically, and explores a variety of mathematical topics (Whitin & Wilde, 1992). Murphy (1999) suggested that picture books not only engage children and help them make mathematical connections but also provide visualizations of mathematical concepts in the illustrations. In a study linking children's literature with mathematics, Clarke (2002) reviewed teachers' summary comments and concluded that as a result children were better at explaining their reasoning and strategies, enjoyed mathematics more, showed greater overall persistence on difficult tasks, were thinking more about what they had learned, and experienced a level of success. Research also indicates that when children's literature and numeracy are connected in an interactive and meaningful way, students will understand the mathematics concepts readily and will sustain the knowledge (Raymond, 1995). Math scores have also been shown to increase when math strategies are combined with literature (Jennings, 1992).

Using Children's Literature With Specific Math Content

There are many books in my collection that the children and I use first to enjoy a great story, a wonderful rhyme, a good pattern, or excellent illustrations, and then we revisit them to make mathematics connections. Table 1 lists a sampling of books with math content.

Counting books are part of the classroom library, many of which allow us to count with some of our favorite literary characters. *Olivia Counts* (Falconer,

Table 1
Children's Literature With Specific Math Content

Book	Math concepts
<i>Olivia Counts</i> (Falconer, 2002)	Counting, patterns, one-to-one correspondence, symbols
<i>Cha-Cha Chimps</i> (Durango, 2006)	Counting down, patterns
<i>Moja Means One: A Swahili Counting Book</i> (Feelings, 1992)	Counting, symbols
<i>Eating Fractions</i> (McMillan, 1992)	Fractions, sorting, classifying, symbols
<i>How Much Is a Million</i> (Schwartz, 2004)	Place value, base 10, repeating patterns, terminology
<i>Ten Black Dots</i> (Crews, 1995)	Number family patterns, representations
<i>The Doorbell Rang</i> (Hutchins, 1989)	Measurement, division
<i>Alexander, Who Used to Be Rich Last Sunday</i> (Viorst, 1987)	Addition, subtraction, money

2002) is a class favorite. A newer book that the children have asked to have read time and again is *Cha-Cha Chimps* (Durango, 2006). Students love the rhythm and rhyme and join in enthusiastically counting down—10 chimps, 9 chimps—all the while doing the jungle boogie. I am also able to introduce children to different cultures through some counting books such as *Moja Means One: A Swahili Counting Book* (Feelings, 1992). Using *Ten Black Dots* (Crews, 1995), we explore number family patterns using a variety of manipulatives.

Other books with specific math content are also part of my library. We not only talk about fractions when we read *Eating Fractions* (McMillan, 1992), we also engage in several learning experiences with real foods as we explore this book. I also read selections from *How Much Is a Million* (Schwartz, 2004). As we begin to explore place value later in the school year, we collect Boxtops for Education for our Parent-Teacher Association, which we bundle into tens in an attempt to reach a million. We read *The Doorbell Rang* (Hutchins, 1989) and again follow a recipe and bake cookies. The all-time favorite, *Alexander Who Used to Be Rich Last Sunday* (Viorst, 1987) can be used to add and subtract amounts of money.

Using Children's Literature Without Specific Math Content

The Wolf's Chicken Stew (Kasza, 1996) is first and foremost a great story for children. That it contains one hundred pancakes and donuts and a cake weighing a hundred pounds gives it a wonderful tie-in to the hundredth day of school. There are many other children's literature titles that I have used to make math connections. *Cook-a-Doodle-Do!* (Stevens & Crummel, 1999) is another book that involves measuring and baking. I use *Six-Dinner Sid* (Moore, 1993) to reinforce the idea of patterns (six houses, six dinners, six names, six ways of behaving, and so forth) and repeated addition. *Tikki Tikki Tembo* (Mosel, 2007) is a wonderful book for connecting phonological awareness and math. As the students work on counting the number of syllables in names, the book characters' and their own, we create a graph of this information. After enjoying *A Chair for My Mother* (Williams, 2007), my students explore the costs of chairs in various ads, catalogs, and on the Internet before choosing one

they'd purchase for their mothers. They then set up a proposed savings account and decide how much money they'd need to deposit each week, deciding on the number of weeks, in order to buy the chairs. I also read "The Rule" in *The Stories Huey Tells* (Cameron, 1995). We then relate this story to our unit on Food Groups and explore a balanced diet by "going" to various restaurants and purchasing a meal. The children are given an amount of money and must keep track of their purchases, making this a math learning experience as well. I have found that I can make math connections with almost any piece of children's literature. Table 2 lists a sampling of books without specific math content and possible math connections.

A wonderful result of helping children make math connections is that they begin doing this on their own with books they self-select to read. During book talks once a week, it is not unusual for a student to share a math connection that has been made. One of my favorites was during the sharing of *Henry and Mudge: The First Book* (Rylant, 1996). In the book Henry asks his parents for a dog and they finally agree. Henry searches for a dog that is just right for him and finally finds Mudge, who eventually weighs in at 180 pounds. Matthew told us that he, too, wanted a dog. He searched the newspaper ads and came up with three possibilities that he shared with his parents. They agreed he could have a dog if he saved up part of the price. Matthew told us that he was putting aside US\$2.00 a week from his allowance to save up his US\$30 share. He brought out a small calendar that he had marked with the 15 weeks until he could "buy" his puppy and was adding the savings on the calendar each week.

What Are the Steps in Making the Literature/Math Connection?

The teacher's role in selecting and reading aloud pieces of children's literature that make the literature/mathematics connection is a powerful one (Columba et al., 2005). As picture books are usually the first type of children's literature that young children encounter (Trelease, 2001), the purposeful selection of these books for interactive read-alouds is important for developing reader, text, and context connections (Rosenblatt, 1978, 1995). Teachers are also responsible for helping young children make text-

Table 2
Children's Literature Without Specific Math Content

Book	Math concepts	Strategies
<i>The Wolf's Chicken Stew</i> (Kasza, 1996)	Counting, ordinal numbers, measuring, graphing, size, division	Count by ones or tens, recognize of ordinal numbers, measure to follow a recipe, tally and graph favorite foods, compare animal sizes, divide amounts of food
<i>Cook-a-Doodle-Do!</i> (Stevens & Crummel, 1999)	Measuring	Follow a recipe
<i>Six-Dinner Sid</i> (Moore, 1993)	Patterns, repeated addition	Look for patterns, add the different ways Sid behaves, count things he eats
<i>Tikki Tikki Tembo</i> (Mosel, 2007)	Counting, graphing	Count syllables in names, graph results
<i>A Chair for My Mother</i> (Williams, 2007)	Costs, savings, estimation	Explore chair costs in catalogs and on the Internet, set up proposed savings account, decide on deposit needed per week to make purchase, estimate money in a jar
"The Rule" from <i>The Stories Huey Tells</i> (Cameron, 1997)	Money, purchasing a meal	Discuss a balanced diet, explore menus, spend allotted amount of money, add taxes and tip
<i>Henry and Mudge: The First Book</i> (Rylant, 1996)	Money, costs, savings, weight	Decide length of time it would take to purchase a dog based on a specific allowance, comparisons of dogs' weights

to-self, text-to-text, and text-to-world connections (Fountas & Pinnell, 2001) by scaffolding the learning experience (Berk & Winsler, 1995; Vygotsky, 1978/1934) during the read-aloud format.

It is important for teachers not only to choose excellent pieces of children's literature to share with their students but also to help students make connections to their lives and connections to other content areas while constructing meaning from those books (Hyde, 2006). When those read-aloud selections are also chosen to develop mathematical ideas, mathematics is humanized, its relationship to the arts is emphasized, and the picture books and extension activities stimulate positive reactions, interest, enjoyment, and confidence in children (Lawrence, Hope, Small, & Martin, 1996 as cited in Columba et al., 2005). Hyde (2006) recommended that teachers use the time-tested comprehension strategies of asking questions, making connections, visualizing, inferring, predicting, determining importance, and synthesizing in

both interactions with children's literature and interactions with the mathematics connections that stem from these texts.

Finally, teachers should choose extension activities that provide authentic hands-on exploration of the connections between literacy and mathematics throughout the curriculum (Morrow & Gambrell, 2004). These strategies provide teachers and learners with opportunities to explore the topic at hand, expand the language of the text (Sulzby & Teale, 1987), and make the experience both enjoyable and thought-provoking (Columba et al., 2005).

I purposely plan to use picture books with math content and picture books with which I can help children make math connections in my classroom. The children and I enjoy the stories and illustrations first and then revisit the books to connect content to our lives and to mathematics. Picture books do have power, and literature and math connections are alive and well in my classroom.

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